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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,275	02/24/2004	Tsutomu Tetsuka	648.43518X00	8920
20457	7590	04/20/2006	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/784,275

Applicant(s)

TETSUKA ET AL.

Examiner

Rudy Zervigon

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— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group II, claims in the reply filed on March 14, 2006 is acknowledged. The traversal is on the ground that "Accordingly, applicants submit that the Examiner has failed to show distinctness in accordance with the requirements of MPEP 9806.05(e)...". This is not found persuasive because the Examiner demonstrated distinctness by a showing the differing classifications as well as the art-accepted property of plasma processing apparatus which can perform non-plasma processing such as a CVD method. When the structure recited in the reference (in this case the application) is substantially identical to that of the claims, claimed properties (plasma ignition) or functions (plasma generation) are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01). The requirements to perform a CVD method in a "plasma" processing apparatus are (a) gas source(s) and a chamber. The claimed apparatus has these features.

The requirement is still deemed proper and is therefore made FINAL.

### ***Information Disclosure Statement***

2. The information disclosure statement filed February 24, 2004 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. The NPL document is not translated, and there is no abstract.

***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “conductive portion”, “surface portion” must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 requires “a surface portion of an inner wall of the reaction chamber that is directly exposed to plasma is covered with a dielectric”. How can “a surface portion of an inner wall of the reaction chamber that is directly exposed to plasma” be also covered with a dielectric?

7. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 requires elements “conductive portion”, “surface portion”. Nothing in Applicant’s specification details such parts.

8. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 requires “a conductive portion”. It is uncertain if the conduction is thermal or electrical.

9. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims require “a DC earth”, “the DC earth”. It is uncertain what if any

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additional element is being claimed. Is “a DC earth” the unprotected chamber – Applicant’s 101; Figure 5a?

10. Claim 8 recites the limitation “the mounting surface”. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim requires “capacity coupling”. It is uncertain what “capacity coupling” is.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kadomura; Shingo et al. (US 6391437 B1). Kadomura teaches a plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) for processing a substrate (40; Figure 16; column 44 line 4) with plasma (“dry etching”; column 45, line 57) by applying a high frequency (91; Figure 16; column 46, line 1) to a reaction chamber (21a; Figure 16,20a, 20b column 49, lines 32-49) so as to generate plasma (“dry etching”; column 45, line 57) therein, and applying a second high frequency (32; Figure 16) to a substrate holder (10; Figure 16) on which the substrate (40; Figure 16; column 44 line 4) is placed so as to control the ion energy to the substrate (40; Figure 16; column 44 line 4); wherein a surface portion of an inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16,20a, 20b

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column 49, lines 32-49) that is directly exposed to plasma (“dry etching”; column 45, line 57) is covered with a dielectric (113; Figure 20a; column 49, lines 32-49), a conductive portion (“matrix” 112; Figure 20a; column 49, lines 32-49) is disposed to a portion of the surface portion covered with dielectric (113; Figure 20a; column 49, lines 32-49), and a DC earth (see chamber grounding - 21a; Figure 16) is disposed to the conductive portion (“matrix” 112; Figure 20a; column 49, lines 32-49), as claimed by claim 1. Applicant’s claim requirement of “so as to control the ion energy to the substrate” is a claim requirement of intended use. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Kadomura further teaches:

- i. The plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 through 6, wherein either a base material (113; Figure 20a; column 49, lines 32-49) of the DC earth (see chamber grounding - 21a; Figure 16) or a protective coating (113; Figure 20a; column 49, lines 32-49) disposed on a surface of the DC earth (see chamber grounding - 21a; Figure 16) coming into contact with plasma (“dry etching”; column 45, line 57) is composed of conductive ceramic, SiC, Al or Al compound, as claimed by claim 7
- ii. The plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 through 6, wherein when a base material (113; Figure 20a; column 49, lines 32-49) of the DC earth (see chamber grounding - 21a; Figure 16) is composed of a non-metallic material such as

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conductive ceramic, SiC, Al or Al compound, a conductive member (18a; Figure 20a) having a conductivity  $\sigma$  of 1  $\Omega$ -cm or less is provided to the mounting surface of the DC earth (see chamber grounding - 21a; Figure 16) by evaporation, spraying or interposing, thereby reducing the earth (see chamber grounding - 21a; Figure 16) resistance of the DC earth (see chamber grounding - 21a; Figure 16), as claimed by claim 8

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 2, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura; Shingo et al. (US 6391437 B1). Kadomura is discussed above. Kadomura further teaches:

- i. The plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to claim 1, wherein the dielectric (113; Figure 20a; column 49, lines 32-49) covers 90% or more (see 21a; Figure 16) of a total surface area that is directly exposed to plasma (“dry etching”; column 45, line 57) – claim 2

Kadomura does not teach:

- i. the conductive portion (“matrix” 112; Figure 20a; column 49, lines 32-49) has an area corresponding to less than 10% of the inner wall (18a; Figure 20a; column 49, lines 32-49) area of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49) – claim 2



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- ii. The plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to claim 1, wherein the conductive portion (“matrix” 112; Figure 20a; column 49, lines 32-49) has an area corresponding to 0.1% to 10% of the area of the inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49), as claimed by claim 3
- iii. The plasma (“dry etching”; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 through 4, wherein the dielectric (113; Figure 20a; column 49, lines 32-49) is a protective coating (113; Figure 20a; column 49, lines 32-49) formed of insulating ceramic such as carbide, oxide or nitride, as exemplified by SiC, boron carbide and alumite, and a thickness  $d$  of the dielectric (113; Figure 20a; column 49, lines 32-49) coating is determined so that, with respect to the relationship between frequency  $f$  of the high frequency (91; Figure 16; column 46, line 1) applied to the substrate (40; Figure 16; column 44 line 4) and the dielectric (113; Figure 20a; column 49, lines 32-49) constant  $\epsilon$  of the dielectric (113; Figure 20a; column 49, lines 32-49), an impedance per unit area  $R = d / (2 \cdot \pi \cdot f \cdot \epsilon)$  when said high frequency (91; Figure 16; column 46, line 1) is propagated by capacity coupling through the dielectric (113; Figure 20a; column 49, lines 32-49) portion is  $100 \cdot \text{OMEGA}$ . or smaller, as claimed by claim 5

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Kadomura to optimize the thickness of Kadomura's chamber surface parts (111B; Figure 20A).

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Motivation for Kadomura to optimize the thickness of Kadomura's chamber surface parts is for minimizing the stress due to thermal expansion as taught by Kadomura (column 29; lines 1-10).

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura; Shingo et al. (US 6391437 B1) in view of Kazumi; Hideyuki et al. (US 6388624 B1). Kadomura is discussed above. Kadomura does not teach :

- i. The plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 through 5, wherein a magnetic field generation means is disposed outside the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49) to apply magnetic field to the plasma ("dry etching"; column 45, line 57), and the DC earth (see chamber grounding - 21a; Figure 16) is disposed at a position crossing a magnetic line of force that is closer to the substrate holder (10; Figure 16) than a magnetic line of force that crosses either the inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49) having the dielectric (113; Figure 20a; column 49, lines 32-49) coating or a surface of an earth (see chamber grounding - 21a; Figure 16) member disposed on the inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49), as claimed by claim 6

Kazumi teaches a similar capacitive coupling plasma apparatus (Figure 3) including equivalent means (16; Figure 1) for magnetic field generation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Kazumi's equivalent means (16; Figure 1) for magnetic field generation to the apparatus of Kadomura.

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Motivation to add Kazumi's equivalent means for magnetic field generation to the apparatus of Kadomura is for creating a plasma with "high density and high uniformity can be generated in a wide parameter region" as taught by Kazumi (abstract).

***Claim Rejections - 35 USC § 102/103***

17. Claim 4 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kadomura; Shingo et al. (US 6391437 B1). Kadomura is discussed above. Kadomura further teaches the plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 through 3, wherein the DC earth (see chamber grounding - 21a; Figure 16) is located at a position where a floating potential of plasma ("dry etching"; column 45, line 57) is substantially equal to or greater than the floating potential of plasma ("dry etching"; column 45, line 57) at either the inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49) covered with the dielectric (113; Figure 20a; column 49, lines 32-49) or a surface of an earth (see chamber grounding - 21a; Figure 16) member disposed on the inner wall (18a; Figure 20a; column 49, lines 32-49) of the reaction chamber (21a; Figure 16, 20a, 20b column 49, lines 32-49), with respect to said high frequency (91; Figure 16; column 46, line 1) or said second high frequency (32; Figure 16), as claimed by claim 4.

It is uncertain if Kadomura's location of the DC earth is located at a position with Applicant's desired outcome. However, the Examiner believes that relocating an apparatus component may be an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the

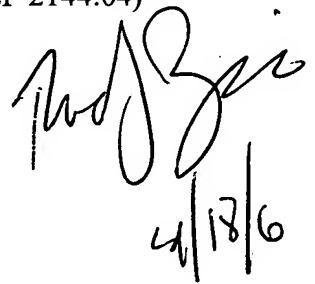
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scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

In the event that Kadomura's apparatus is not deemed to anticipate the DC earth is being located at a position with Applicant's desired outcome:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the relative position(s) of Kadomura's apparatus parts.

Motivation to optimize the relative position(s) of Kadomura's apparatus parts is to optimize the operation of the apparatus. Further, it is well established that the rearrangement of parts is considered obvious to those of ordinary skill (In re Japikse , 181 F.2d 1019, 86 USPQ 70 (CCPA 1950); In re Kuhle , 526 F.2d 553, 188 USPQ 7 (CCPA 1975); Ex parte Chicago Rawhide Manufacturing Co. , 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).; MPEP 2144.04)

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